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ABSTRACT

In 1986, Paducah Community College (PCC), a small rural college in western Kentucky, signed an agreement with Murray State University (MSU) to have MSU teach junior- and senior-level courses on the PCC campus. As costs became prohibitive for MSU, the two institutions began examining distance learning possibilities. At the same time, the seven area high schools were experiencing difficulty providing classes due to high costs. Together with the area high schools, PCC and MSU formed the West Kentucky Education Technology Cooperative. A feasibility study for distance learning approaches was conducted; it recommended a combination of microwave point-to-point locations and fiber optic systems. The T-1 multi-line telecommunications tool, provided by South Central Bell, brought the entire system into operation. In fall 1990, the first set of MSU courses was offered at PCC in math, nursing, business, education, and environmental health. To identify problem areas, student and instructor attitude surveys were completed at the end of the first year of operation. As a result of PCC's experience with distance learning technology, the University of Kentucky initiated a graduate center remote delivery system at PCC, offering graduate programs to support economic growth in the local community. In addition, PCC expanded its own interactive system to two other community colleges and activated programs at three of the original seven high school sites. All sites in the network are able to fully interact with any other site. On the PCC campus, a student can now earn a bachelor's degree, a master's degree, and a doctoral degree. A detailed cost analysis and a discussion of further applications of the telecommunications technology are provided. (PAA)

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A RURAL COMMUNIVERSITY:
TEACHING DEVELOPMENTAL THROUGH
GRADUATE COURSES VIA TWO-WAY VIDEO

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PADUCAH, KENTUCKY - DEVELOPING A COMMUNIVERSITY

WHAT WORKS

Paducah Community College (PCC) is a small rural institution in far western Kentucky enrolling 3,200 students. The city and county have a total population of 55,000, and PCC serves seven other rural Kentucky counties (Figure 1). The campus is 50 miles from the nearest regional university - Murray State. The city of Paducah is the regional hub of commerce, government and industry. So, as in many communities of our genre, there is a great interest from community leaders to have us offer upper division and graduate programs; to, in effect, become a four-year college.

PCC has been active in cable casting for many years. In 1978 we began operating a public access channel for the local cable company, and we currently operate three access channels, one governmental, one educational, and the third, the public access channel. The latter has evolved into the Community Access Channel, with 12 hours of programming daily. Thus, we are no stranger to the medium and were investigating a method by which we could interconnect with the Kentucky Educational Television Network, thereby originating instructional courses and becoming producers of instructional television courses, nearly a decade ago.

Moreover, in 1986, PCC signed an agreement with Murray State University (MSU) to have MSU teach junior and senior level courses on our campus. The cost for Murray became

prohibitive, as they had to shuttle faculty back and forth. It was then that we started exploring distance learning possibilities.

Meanwhile, paralleling our investigation, were seven area high schools which could not provide certain classes due to cost (Figure 2). PCC and MSU contacted the high schools and together they formed the West Kentucky Education Technology Cooperative. Immediately, this unique group began seeking funding sources to implement an interactive television project. The Tennessee Valley Authority showed interest in and concern for the plight of the rural high schools and agreed to fund a feasibility study on how to best link them with the Colleges. The study, completed by Telesystems Inc., recommended a combination of microwave point-to-point locations and fiber optic systems. Soon after, South Central Bell heard about our need and invited us to try adopting one of their tools (T-1) for an educational application.

That was our introduction to videoteleconferencing and it has revolutionized our College and community. T-1 offered all of the essential ingredients and eliminated many drawbacks. In fact, it allowed PCC to create its own private network, importing and exporting classes around the state.

Fall 1990 was our first semester of operation, and we planned to bring in four classes from MSU, but demand pushed the four classes fo five, six and more, in math, nursing,

business, education and environmental health. Despite the heavy reliance on technology, we lost more class meetings to professor absenteeism than to technical problems. At the conclusion of the semester, student and instructor attitude surveys were carefully reviewed and found to be uniformly positive. There were some problems, but all were easily resolved including one or two which required replacing or changing equipment.

In Spring 1991, PCC/MSU offered six classes, but again demand forced the ceiling higher. One was a dual enrollment Geology class. Again, the method received positive responses from users. Enrollment pressures caused us to schedule eleven classes last semester.

While PCC was stepping through this process, the University of Kentucky was contemplating the establishment of graduate study centers away from its main campus in Lexington. These centers would offer graduate programs that communities could use to support local economic growth. In Paducah's case, Engineering, coupled with the State's need to support the newly-enacted Kentucky Education Reform Act of 1990 were chosen as priority areas. Paducah was one of several possible graduate sites considered. Our clinching advantage lay in our experience with technology. The University liked our T-1 system so much that they modeled the entire graduate center remote delivery system after it. Now

a separate network began to grow within the UK system. In Spring 1991, it included graduate centers in Paducah and Owensboro (Figure 3). This year, new ones in Ashland and Hazard will be added. Connections have also been made to the University of Kentucky Medical School.

While this was going on, we were not standing idle on other fronts. With MSU, PCC expanded the interactive system to community colleges in Madisonville and Hopkinsville, and activated three of the original seven high school sites (Figure 4).

Today, each of the sites in the network are able to fully interact with any of the others. Eventually, the state intends to expand the network, bringing in the remaining high schools, regional universities, ten community colleges and state government. Public schools statewide are looking at establishing their own network, which could be connected to the post-secondary vocational schools and higher education facilities. The Paducah network is well along the road to dial-up education.

In rural settings, the T-1 solution works (Figure 5). Small schools that can't afford certified teachers in advanced science, math and foreign languages and the like can now pool resources.

Community colleges can easily offer classes at remote sites taught by faculty on-campus. Place-bound students can now interact with classmates, seeing, hearing and directly

experiencing each other and the instructor.

Regional universities, struggling to support teachers and students over considerable distances and with limited faculty resources, now have a tool that allows them to reach into those remote sites. State universities facing a need to provide statewide services can fulfill that mission without losing days of productive time on the road, wearing out a fleet of cars.

Today, on the campus of Paducah Community College, one can earn an associate degree in a transfer or technical field, a bachelor's degree in four different areas from a fully accredited regional university, master's degrees in three areas from the regional university, master's level courses in chemical, mechanical and electrical engineering from the University of Kentucky, and an Ed.D. in two different areas of concentration, also from UK. Consequently, entering freshmen might now, depending on their field of study, work all the way through the doctoral level on one community college campus, a true communiversity.

Now it's time to get to the bottom line. Let's look at the cost summary sheet showing a T-1-equipped room (Figure 6). The up-front costs can be steep. That was one of the main reasons for our original nine-member co-op; to give us greater clout in soliciting funds. These prices are estimates based on our experience in the marketplace. We have been very pleased with the results and have resisted

the temptation to constantly change as technology shifts. One bit of good news is that fierce competition among vendors is continually driving prices down. The cost curve is much like we've seen in computers, with prices falling while performance improves.

Another cost factor is line charges. This system uses transmission lines, which are the equivalent of 24 conventional phone lines. Line rates vary dramatically depending on variables such as local service cost, long distance carrier, and one's relationship with the local phone company. We are spending about $1,200/per month and recently exploited the technology to save money on long distance phone and data transmission. Again, compared to the cost of faculty wages and the costs and hazards of student/faculty travel, T-1 is a bargain. Another fiscal benefit of the technology is that it can be a revenue generator. PCC has had serious inquiries from the Social Security Administration, the Veteran's Administration, the Department of Agriculture and the Department of Health and Human Services about buying time on the system. Anyone who must frequently travel for meetings or training activities, state, local or federal, is a potential client.

Finally, and most importantly, the driving force behind all of this is, of course, the student (Figure 7). Are they learning more, better, faster? Our research indicates that students at remote sites perform as well or better than those

at the primary teaching sites, and they enjoy all the benefits of the classroom without the hassles of commuting.

WHAT THE FUTURE HOLDS

PCC's aggressive attitude toward distance learning is paying dividends to the community in the form of other major developments (Figure 8). In September 1991, the City and County announced a partnership with South Central Bell, the Greater Paducah Economic Development Council, the Tennessee Valley Authority and the University of Kentucky, to develop a 600-acre site for information-intensive businesses.

This Information Age Park will be home to businesses that require massive movement of information. Park companies will find at their disposal a wide array of communications technology, ranging from satellite services to fiber optics, ready for networking anywhere on the globe. In a single package, Paducah will offer the advantages of small-town living, coupled with state-of-the-art information technology.

The first planned building in the Park is a resource center, designed to help companies find answers to problems. The College will staff the facility and direct users to the training and educational services they need. This will include, but not be limited to, Murray State University, the University of Kentucky Library, Internet, the Area Development District office, and PCC itself.

There are other spin-offs brought on by PCC's traveling in telecommunications circles. In September 1991, the IBM corporation offered to conduct a complete audit of the campus data communications systems. That extensive investigation, valued at $30,000, has been completed. PCC will use the results as the backbone for a major grant application, leading to a fiber optics network for all data, video and audio telecommunications. Then, in December 1991, the College was selected as a test site for IBM's OS/2 and South Central Bell brought its fiber optic cable to the campus.

As for the "Communiversity", its depth and breadth will undoubtably grow. T-1 lines will play a major part, not only through an increasing number of sites, but also through the splitting of on-site signals to multiple rooms (cascading) and running multiple simultaneous programs. The College's CATV Educational Access will play a more active role in instructional programming, as will the new fiber optic highways. The latter will pass through the campus to the Information Age Park, the Area Development District and beyond.

Overall, the instructional program will tend to move to a mode wherein most of the rare and exotic - i.e. graduate education, 2+2 PCC/MSU and low enrollment remote classes are done via IITV. The mundane, comprising around 90% of PCC credit hours, will be taught in the traditional ways.

The public will continue to press for the unique and

exotic, and to measure our success by the amount of this brand of instruction that the school conducts. Our challenge will be to keep all of this in pedagogic and fiscal perspective. Right now, 5% of the instructional program receives the lion's share of our funding and our professional kudos. This imbalance cannot, should not and will not continue.

Paducah Community College

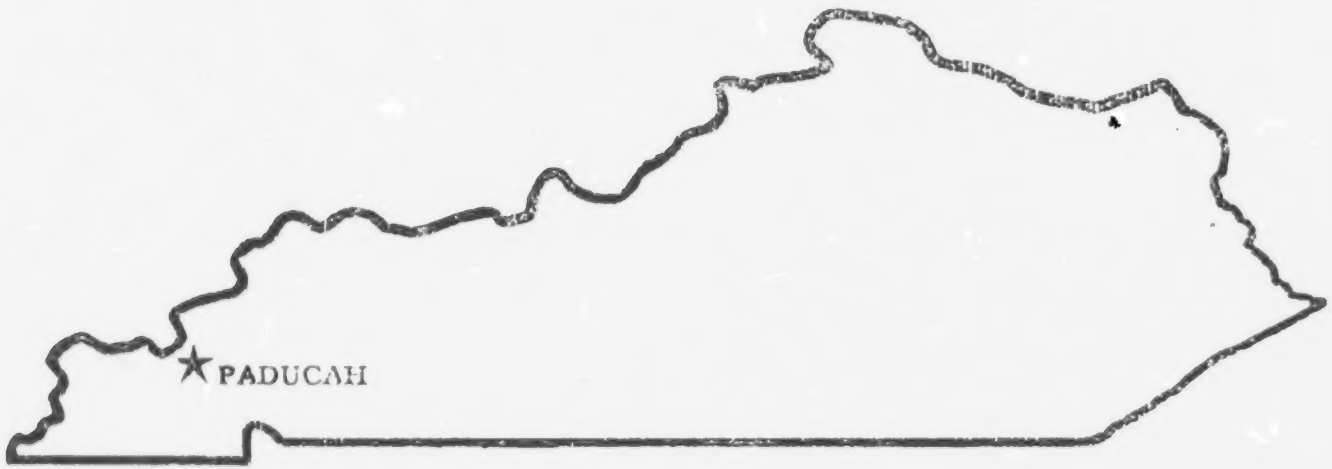

Figure 1

ILLINOIS
R.
Ohio
Mississippi
MISSOURI
PADUCAH COMMUNITY COLLEGE
30 MI.
GRAVES CO. H.S.
MAYFIELD H. S.
20 MI.
MURRAY H. S.
HICKMAN H. S.
25 MI.
CALLOWAY H. S.
MURRAY STATE UNIVERSITY
FULTON CO. H. S.
FULTON H. S.
TENNESSEE

Figure 2

University of KY Video Network

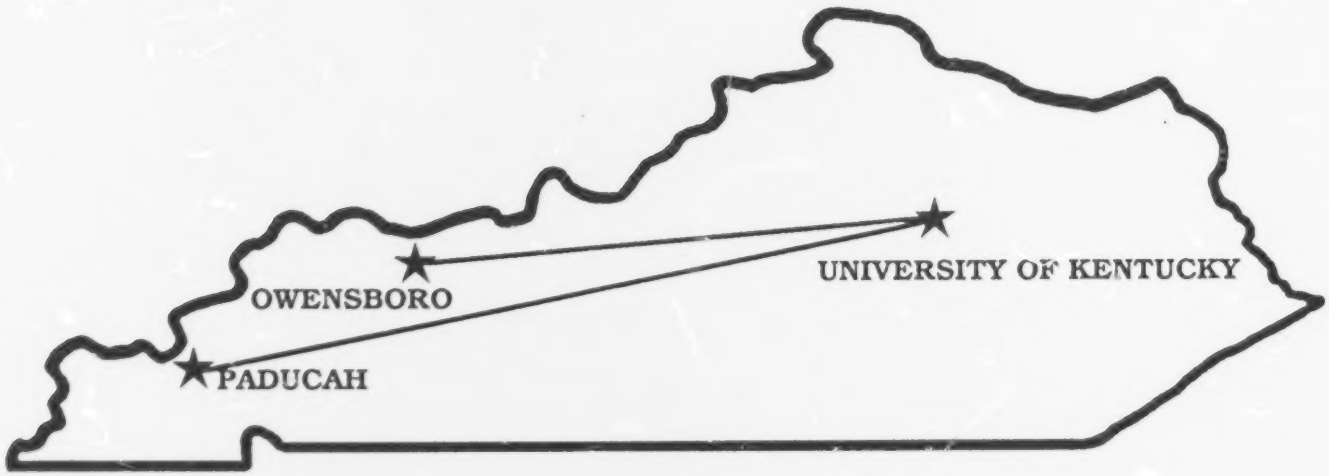

Figure 3

Compressed Video Network

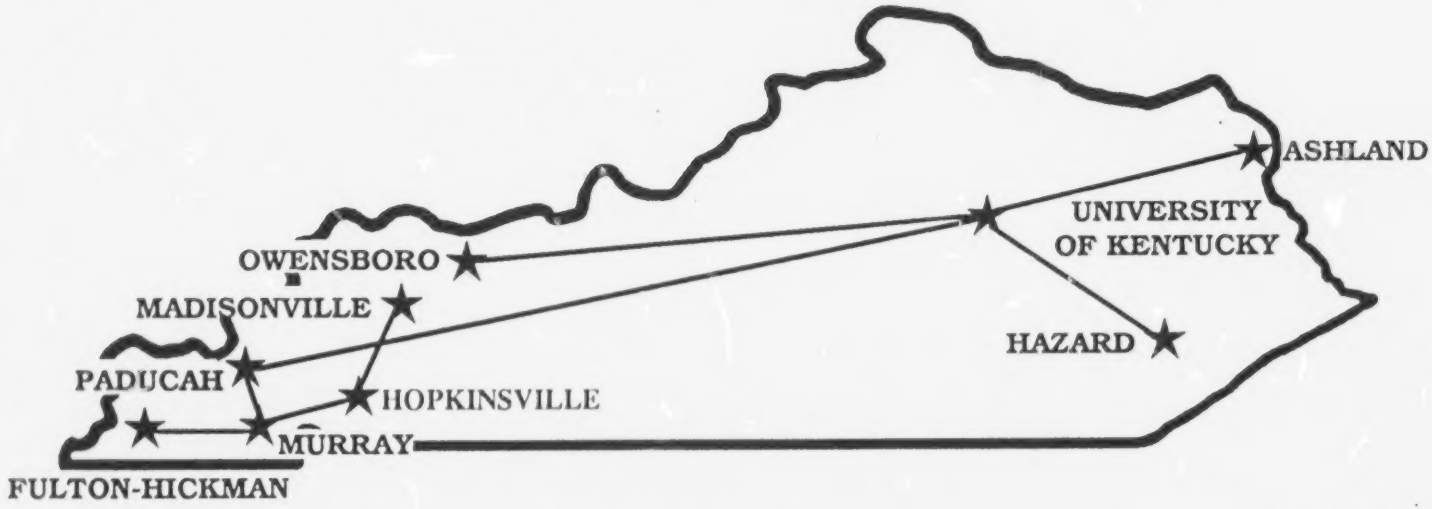

Figure 4

PADUCAH COMMUNITY COLLEGE

"Communiversity"

Associate Degree

Arts
Science

Baccalaureate Degree

Business Administration
Independent Studies
Nursing

Graduate Degree

Communication
Education
Engineering
Nursing

Figure 5

COST SUMMARY

- **Single Moderately-Equipped Room**

- **Network Costs**

Facilities	$ 400.00
Service	375.00
Subtotal	$ 775.00

- **Equipment Costs**

Cameras	$10,000.00
Codec	40,000.00
Controls	1,000.00
Monitors	5,000.00
Subtotal	$62,000.00

TOTAL	**$62,775.00**

- **Line Costs** **$1200/Mo.***

*** Variable**

Figure 6

WHAT ARE WE TEACHING?

- Business
- Communications
- Community Service
- Continuing Education
- Economic Development
- Education
- Engineering
- Environmental Health
- Health Services
- High School Classes
- Math
- Nursing
- Science

Figure 7

INFORMATION AGE PARK

- Information-Intensive Businesses
- Newest Technology
- Multi-level Communication Networks
- World Wide Reach
- Small-town Living
- Paducah Community College Workforce Training

Figure 8

ERIC Clearinghouse for
Junior Colleges
SEP 18 1992